

STRZELECKI

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Sir Paul Edmund de
STRZELECKI.



ART. VII.—*Physical Description of New South Wales and Van Diemen's Land; illustrated by a Geological Map, Sections, and Diagrams, and Figures of the Organic Remains.* By P. E. De Strzelecki. London, 1845.

THIS work is cast in a mould not perhaps the fittest for popularity, but is nevertheless a remarkable production, accrediting highly the scientific acquirements of the author, his

* We have a serious complaint to make of this 'Collective Edition of Chesterfield's Letters,'—it has no Index. It was the same with the 'Collective Edition of Walpole's Letters,' lately issued from the same establishment, and, like this, in other respects satisfactorily arranged. The publisher ought to know that, though such omissions may not be regarded by the keepers of circulating libraries, they are most annoying to people who have libraries of their own, and buy books to be bound, preserved, and consulted—not merely to be read or glanced over, like a 'standard novel,' or some sentimental spinster's *mince* or jocular Captain's *hash* of history or memoirs. In every considerable printing office there may be found some intelligent man willing and able to compile a sufficient index for such a book as this now before us, for a very moderate remuneration, at his leisure hours.

masculine

masculine zeal and intrepidity as a traveller, and his candour, modesty, and clearness as a writer. The subject, moreover, is one which ought to be deeply interesting to English readers. We have as a nation a large stake, augmenting with every successive year, in these our colonies of the southern world; and much obligation is due to the enlightened foreigner who has sought, and successfully, to render his Australian researches not merely profitable to science, but beneficial also to the practical interests of the numerous and energetic people who are spreading the English name and language over these remote shores.

In the various knowledge which he brings to his researches as a traveller, Count Strzelecki is a worthy disciple of the Humboldt school. He has eyes well tutored and intelligent for every part and province of inquiry; for mountains and their minerals; for the great under-world of fossil existence; for botany; for all the conditions of atmosphere and climate, and the electrical and magnetic phenomena which act so largely therein; for agriculture and the chemistry of soils; for languages and the characters of man. These are large endowments, and they are honestly used; with no assumption of knowledge not possessed, and with ample acknowledgment of the labours of others in the same great field.

In commenting on the general merits of this work, we must notice the advantage Count Strzelecki possesses in the extent of his travels over the globe, and the independent activity of spirit which has guided him throughout. A native of Poland, which country we presume he quitted from political considerations, he has passed twelve years continuously in pervagating seas and lands; chiefly those the last and least explored by European adventure, though now yielding to the great tide which civilization, for ulterior purposes in the economy of Providence, is pouring over them. We find from his Preface, that in the course of this period he has visited North and South America, the West Indies, the South Sea Islands, New Zealand, New South Wales, Van Diemen's Land, the Javanese Islands, part of China, and the East Indies, and Egypt. Though this volume is limited to Australia, we have abundant proof in the notes and illustrations appended to it, that the same acute faculty of inquiry has accompanied him through these various regions; the survey of one furnishing instruction and preparation for that of another, and with instruments of research fashioned and sharpened by constant exercise. From the specimens of his manuscript journals occasionally afforded in the present volume, we are well justified in desiring that they may hereafter become known to us in their more entire state.

In a recent article of this Review we had occasion to discuss—
courteously,

courteously, we hope, as well as justly—the relative merits of a fair class of travellers who occupy a large place in the literature of the day; and we indicated certain parts in the history of travel where the female eye and instinct gather up observations, the finer lights and shades of things, not equally attained by the grosser or graver perceptions of our own sex. A volume by Mrs. Meredith on the very countries now brought before us in the work of M. Strzelecki, furnished an apposite and agreeable illustration of our meaning. We spoke highly of this volume at the time, and can afford to repeat our commendation of it.

At a moment when the fashion of travelling, fostered by facilities heretofore unknown to the world, has reached to so extraordinary an extent, and is yet in progress further, we cannot, we conceive, do amiss in adding some few general remarks, applicable chiefly to those graver inquiries of the traveller which embrace the physical history and character of the earth itself, and of the various forms of organised life spread over its surface—and, further, the antiquities, languages, diversities of conformation, social and political economy of the various races and nations of men—objects which, even thus summarily stated, will be seen to comprise a vast circle of knowledge and to require great variety of talent for their successful pursuit. There is the more reason for this, seeing the very large part which our own country bears in the prevailing fashion of the time. It would probably be below the truth, were we to rate the number of travellers furnished forth by our narrow island as thrice that belonging to any equal amount of population in the world. The overflowing commerce and colonial establishments which render England a sort of *officina gentium*; our national wealth and manner of education; and, it may be, other habits of our social life, are all concerned in this effect; which, with every allowance for the vagaries of mere fashion, must be admitted as no bad criterion of the intelligence and moral culture of a community. The great and almost fearful facilities of locomotion which have recently come into existence, and, aided by the capital and energy of England, are still growing with gigantic rapidity by land and sea, have already levelled the surface of the globe to all ranks and conditions of men. Our small country squires, shopkeepers, and artisans, traverse and crowd those regions which heretofore were accessible only to the wealthy and curious few. Tourists whose aspirations were once bounded by the Loire, Rhine, or Po, are now familiarly found in Greece, Palestine, and Egypt; and the transit from New Bond Street to the Bazaar of Constantinople, or to those Pyramids which, in the phrase of an eloquent old writer, ‘astonish Heaven with their audacity,’ is as readily made as was sixty years ago the journey from London to Inverness.

Inverness. The 'felix qui patriis ævum transegit in agris' is a being well nigh lost to the world, and not likely to be ever restored to us again. All these are mighty changes, and of high import to the future destinies of man. The large part we have in them makes it most fitting that this part should be worthily performed, and as becomes a nation having instruments of great power in its hands.

It would be difficult to class in any way travellers so numerous, and carrying with them such various and complex interests and motives, as those whom we annually send from our shores. Business and idleness—the pursuit of knowledge or that of pleasure—fortune and misfortune—health and sickness—are all concerned in furnishing cause for these migrations. For our present purpose, however, it is enough to divide them into such as go abroad without any power or design of adding to the information of others, whatever may be their own particular gain; and those who travel with higher objects and resources, seeking to extend the domain of human knowledge, and thence to win honourable fame to themselves. It is not very easy indeed to bring that numerous and increasing body, the authors of books of travels, under this simple classification. We fear, however, it must be avowed, that the great majority of these works, whatever their profession, do in fact add little to the sum of our knowledge; and that vanity and book-craft are much concerned in their production and ephemeral existence. Facts transcribed more or less openly from prior sources of information, and fringed with descriptions of scenery and exaggerated anecdotes of personal adventure, form the great staple of most of these volumes. They are like in this to the palimpsest manuscripts of the Vatican and Ambrosian libraries, that if the superficial writing be removed, the more valuable characters come out from underneath, the obvious work of other hands and a former time. What may best be alleged for these books is, that they are a source of harmless pleasure to many; and that in reviving recollections, and repeating in various forms the knowledge already gained, they tend to keep it floating on the surface and more accessible for daily use.

There are no absolute gaps in the world; and we rise by steps from these lighter tourists and authors of the day to the higher labours, in whatever shape they be recorded, of men who bring to their travels matured knowledge, the genius of discovery, or the power of patient and laborious research. We most willingly recognise the many travellers of our own country who belong to this higher class; and contemplating the total surface of the globe as the arena, we believe there is no nation which has gained so much, or will transmit to posterity such various records of suc-

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cessful inquiry. Our maritime position has mainly contributed to this result; and, looking more especially to the present time, we may cite as eminent instances the several expeditions of arctic and antarctic discovery which have been sent forth during the last twenty years; including, by an earnest anticipation of success, that which is at this moment on its way to achieve—if achievement be possible by energy and skill—the ancient problem of the north-west passage. Our old maritime discoverers in this course, the Frobishers, Hudsons, and Baffins, gave marvellous examples of intrepidity in traversing unknown and dangerous seas with their small and ill-provided barks. But science has now been added to boldness; and since the time of Cook's voyages, all our expeditions, and especially those of latest date, have comprised men admirably qualified by their various pursuits and attainments to advance the progress, not of geography alone, but of every branch of physical knowledge, by land as well as on sea. We might indulge in a long list of names to confirm our assertion, were they not too familiarly known to require such notice.*

It is needful, however, to admit that this superiority is not equally maintained by our travellers on land only. In relation to their number, the proportion of those of high attainment and fitness for their vocation is less than in Germany; nor can we justly claim at this moment the place of foremost in reputation. The fact as to relative proportion is readily explained. In the mass of English travellers circulating over Europe, and countries beyond, we find classes and descriptions of persons who in the social economy of other nations seldom or never quit their native soil. We have already alluded to this; and were it needful, might comment more minutely on the composition of that extraordinary multitude who carry the English name, character, and habits, over the face of the earth; including (as we may remark for our present purpose) a vast mass of the middle class of society,—very many for mere matters of business;—and a large number of the young and untutored, fresh from nursery, school, or college. A question of proportion taken from these gives no useful result. The Germans, who quit their own country for travel—much fewer in number, and with smaller means and appliances of every kind—do nevertheless carry with them certain conditions well fitted to successful research—an age sufficiently matured; habits of labour and moderate living; great earnestness of purpose;

* We cannot, however, willingly omit the name of Mr. Charles Darwin; who by his various successful labours and acquisitions during the four years' voyage of the *Beagle*, and by his various works connected with this expedition, has well sustained his family name, and taken a high place among European travellers and naturalists. We rejoice to see that his '*Journal*' has now been reprinted with additions, and in a cheap form.

studies directed beforehand to the particular objects and course of travel ; and it may perhaps be added, that temper of the German mind which revels in the mysteries and obscure places of nature, is ever seeking new systems and combinations in philosophy, and is prone to invest with something metaphysical and imaginative even the most arid technicalities of science.

We have adverted to Germany as the most opposite example in comparison with England ; and would especially comment on one point just noticed, viz., the preparation for travelling by previous study. It would be waste of words to dwell long upon the importance of this. Keeping ever before him the principle to which Bacon has given new force and dignity by his injunction, '*genus humanum novis operibus et potestatibus continuò dotare*,'* the traveller who seeks to occupy a worthy place as such, must make his undertaking commence by labours at home ;—in the closet or museum, the mountain, laboratory, or mine. There is no north-west passage here to lead rapidly and shortly to success ; nor any instinct which can compensate for the deficiencies of knowledge. One man by vigour, or a certain happiness of faculty, may redeem these deficiencies more speedily than another ; but as far as they exist, they must render sterile to the traveller any soil he traverses, however fruitful and abounding to those who come well prepared to gather a harvest there.

This is alike true as regards all branches of science and objects of research. The latter should be defined beforehand, as far as this may be possible. The enlightened traveller will interest himself in whatever is known, thoroughly or partially, of the countries he is about to explore ; and equally in all that is yet undone and unknown. If it be wholly a new field (and many such still remain on the surface of the globe), the demand for preparation in one view is greater, as the objects are less defined. But on the other hand, everything is here pure gain, and none can come back from such places altogether unladen.

These observations may seem trite and needless ; and yet they are in some sort justified by what we are bound to consider a deficiency in the education of travellers in our own country. We willingly except from this remark the many eminent naturalists (amidst whom our geologists are conspicuous), and the numerous learned in history, antiquities, languages, &c., who carry out with them all the acquirements needful for successful travel. But it is a question of proportion and degree ; and we are persuaded more might be done, both at our universities and elsewhere, to fashion the minds and hands of those who have the world before them for active survey. Without the formality of

* Cogitata et Visa.

normal schools for travellers, we are persuaded that much might be effected through our old academic institutions, if rightly moulded and applied to this end.* And in the more recent institution of the Geographical Society, were it enlarged and supported as its importance well deserves, we perceive an admirable basis for some such scheme of instruction; which, by affording exact and ready information to the future traveller—indicating to him, in regard to the countries and objects he has in view, what remains to be done, and the method and instruments by which these *desiderata* may best be attained—would tend to repair the deficiencies under which we still labour in this respect. Some effort and expense might well be devoted to this desirable end.†

A few remarks more before coming to the work under our review. We have spoken of M. de Strzelecki as a traveller of the Humboldt school, meaning thereby to designate a method and scope of research of which Humboldt himself has furnished the most illustrious example. No rigid definition can be given of this method, inasmuch as it is only the extension and more perfect form of that which must be the course and purport of every scientific inquiry. But it is the amount of this perfection with which we are here concerned. The naked observation of facts must ever be essentially the same process, with due allowance for variation in the important elements of number, minuteness, and accuracy; and no observer so crude, as not to bring his facts into some connexion with each other, or with kindred parts of human knowledge. But the method to which we allude, which has grown with the growth of science, and become strong in its strength, rests upon a foundation common to all true philosophy. It views nature through the relations and analogies of parts; throws an eagle glance over objects seemingly the most remote and dissociated; masters difficulties by attacking them from points already known and secured; and achieves, by a principle of research, results which no rude or untutored observation can attain.

Setting aside, then, the diversity of talent in individual ob-

* We are compelled here to advert to the travelling fellowships at our universities. With two or three eminent exceptions, it must be allowed that these have been singularly unfruitful in results to the world.

† We perceive with pleasure by the Address last year to the Society from their late excellent president, Mr. Murchison, that attention has been directed to this point; and a plan adopted of recording the desiderata for future travel in different countries, under such revision and arrangement as to render them most accessible and useful for reference. This plan, if duly executed, is good in itself, and capable of extension to other and larger purposes.

We have always admired these ancient maps of D'Anville, in which the parts unknown, instead of being filled up with imaginary mountains and rivers, are left as honest blanks, with the few simple words upon them—'*Desideratur hujus tractus accuratior descriptio.*'

servers,—a matter doubtless of much importance—this superiority of method mainly depends on the more enlarged and various knowledge of the sciences, and their mutual connexions, which the traveller brings with him, ready and ripened, into the field of action. What old Roger Ascham says on another subject, ‘Even as a hawk flieth not high with one wing, even so a man reacheth not to excellency with one language,’ is in some sort applicable here. The man of one science only, from default of that power which works among the relations of things, can never attain the highest excellence even in his own proper pursuit. And this is equally true whether he be studying quietly at home, or pursuing knowledge through toil and adventure in foreign lands.

An important qualification must, however, be admitted here. The traveller who starts with a single object of research, ignorant or careless of others, may yet, by earnest devotion to this, obtain results which could be gained in no other way. Such instances have been frequent, particularly in the sciences of mineralogy, zoology, and botany; and as we have read somewhere a warm eulogium upon an ‘illustrious arachnologist,’ we see no reason to limit this profitable division of labour, or to doubt that the especial collectors of spiders, beetles, algæ, and lichens, are each and all rendering valuable services to the cause of knowledge. That eminent naturalist, Ehrenberg, whose consummate researches with the microscope we have ourselves witnessed, has laboured for years, and in every part of the world, among the living and fossil Infusoria, the most minute, as far as we know, of organized beings; and by his devotion to the subject has defined what may almost be termed a new science, viz., the formation of mineral masses, and even mountains, from the *débris* of the countless myriads of these microscopic animalcules, whose generations have lived and perished in the succession of ages. But Ehrenberg, though devoted to this subject, is far from being limited to it, or he had failed in attaining what he has done. And it may be fairly repeated that knowledge in its higher advancements,

‘quel cibo

Che saziando di se, di se asseta,’*

whether derived from travel or from other sources, depends for its superiority chiefly on that happy combination of faculties and methods which can bring the several parts of science into relation with each other, and make them gradually converge towards an harmonious whole. No man can put forth powers for all parts of this work; but every one may hold in view the principle and

* Dante, Purgatorio, xxxi. 128.

methods of contribution to it, and thereby render his labours more successful and useful to the world.

In making these remarks, we have mainly in view their application to the higher order of travellers, and to that education for travel, as it may rightly be termed, which we desire to see enlarged and improved. Having connected the name of Humboldt with this topic, we may fitly quote a passage from himself in illustration of it, taken from the Preface to the latest work which this distinguished man has given to the world—we would fain hope not the last, though he seems to intimate that such will be the case. The ‘*Cosmos, or Scheme of a Physical Description of the Universe,*’ is yet little known in England; and it would be too early to characterize minutely this first portion of a work so vast in its bearings and profound in all its views. We might quote many passages to our present purpose, but that alluded to from the Preface must suffice.*

‘While through outward circumstances of life, and an irresistible impulse to various branches of knowledge, I was led to occupy myself many years, and to all appearance exclusively, with particular objects of study, —descriptive botany, geognosy, chemistry, astronomical geography, and terrestrial magnetism—in preparation for a great scheme of travel, I had ever before me a more especial and higher motive for these attainments. My leading impulse was the endeavour to comprehend the phenomena of corporeal things in their common mutual dependences and nature as a whole, moved and vivified through inward powers (*ein durch innere Kräfte bewegtes und belebtes Ganze*). I had from intercourse with highly-gifted men early arrived at the conviction that without a serious devotion to the study of particulars, all large and general views of the world must be little more than airy fabrics. But these unities in the knowledge of nature, from their inward essence are capable, as through an appropriate power, of mutual fructification. Descriptive botany, no longer confined to the narrow circle of determining genera and species, leads the observer who wanders through distant lands and lofty mountains to the doctrine of the geographical distribution of plants over the earth’s surface, in proportion to the distance from the equator, and the perpendicular elevation of the spot. And yet further to unravel the complex causes of this distribution, must we closely examine the laws of

* In rendering this passage from the original, we feel, what every one acquainted with Humboldt’s German writings will recognise, the equal difficulty and importance of adhering as closely as possible to the sense and phraseology of the author. It is well said by Dryden, in one of his admirable prefaces (and who ever so well fulfilled the latter condition as himself?), that ‘a translator must perfectly understand his author’s tongue, and absolutely command his own.’ In addition to these requisites, a translation of the *Cosmos* can be perfectly executed only by one familiar with the subjects of the work, and the spirit of philosophy in which they are handled.

We are tempted to transcribe from the original the last sentences of this volume:—*‘Ein physiches naturgemälde bezeichnet die Grenze, wo die sphäre der intelligenz beginnt, und der ferne Blick sich senkt in eine andere Welt. Es bezeichnet die Grenze, und überschreitet sie nicht.’*

the variation of temperature of climates, as well as of the meteorological changes of the atmosphere. Thus each class of phenomena leads the observer, earnest for knowledge, forward to another class on which it is itself founded, or which depends upon it.'

The researches of Count Strzelecki in New Holland and Van Diemen's Land extended uninterruptedly over a period of five years, during which time he travelled fully seven thousand miles; entirely, as it appears, on foot. This is a prodigious effort in a new country, still only scantily tamed by European culture, and singularly deficient in many of the provisions requisite for the traveller; and its merit becomes greater when we advert to the laborious nature of his inquiries, and to the hazards and privations he incurred in following them out. We have reason to believe that he performed these journies entirely upon his own resources, though liberally aided by the sanction and good will of the colonial authorities. The high regard in which he was held by them, and the colonists at large, was strongly attested in Van Diemen's Land, by an address to him after his departure, signed by Sir John Franklin the governor, the Chief Justice, and all the principal settlers, expressing their admiration of his talents, and esteem for his personal character, and transmitting a subscription of four hundred pounds in aid of the publication of the volume now before us, the value of which they thus recognise by anticipation.

The work is divided into eight sections. The *first* contains a short narrative of the Maritime and Land Surveys of New South Wales and Van Diemen's Land down to the present time; the *second* treats of Terrestrial Magnetism, as observed in these countries; the *third* is devoted to their Geology and Mineralogy; the *fourth* treats of their climatology under several heads; the *fifth* regards the fossil and existing Flora; and the *sixth* the fossil and existing Fauna. The first subdivision of each of these sections includes the description and comparison of all the organic remains which afford geological proof as to the succession and relation of the several formations. The *seventh* contains notices of the physical and moral state of the Aborigines; and section *eight* treats of the Colonial Agriculture, the character and chemical analysis of the different soils of these colonies, and the resources and methods of improvement open to the future enterprise and industry of the settlers.

In an article of this Review some years ago (No. 135), directed chiefly to the social and political economy of our Australian colonies, some slight notices were given of the physical singularities of this great continent, and every year is now rendering them more familiar to us. A strange and paradoxical region it is, and warranting

warranting the expression of a great naturalist—that it seems as if dropt from another planet! This singularity is seen even on approaching its shores, in the dull, monotonous, olive-green colour of the vegetation along the immense line of boundary coast; the same in every part, and at all seasons of the year.* The absence or paucity of great rivers, in a continent which ministers abundant space for streams as large as the Rhine and Danube, adds another character of sameness to these Australian shores. Within, as far as discovery has yet penetrated, and wherever European culture has not brought in partial varieties of form and colouring, the same monotony strikes and wearies the sense. It is hard to conceive anything more strangely melancholy than those vast flats in the interior, described to us by Oxley and other explorers of the country, where rivers stagnate into non-existence in a wilderness of gigantic reeds; and the traveller scarcely finds a knoll high enough to raise him above the waters in the season of floods;—or those wide tracts of thick herbaceous brushwood, fitly called *scrubbs*, affording nothing either to sustain or solace those who traverse them. The long chain of mountains, stretching in line parallel to the eastern coast, affords indeed a more varied landscape, and, as might be expected, greater resemblance to European scenery; but even in these—the skeleton, as it were, of the country—there are several peculiarities of conformation, and, above all, a singular scarcity of the simple minerals, rendering their study more laborious and less inviting to the naturalist.

Our Museums and Zoological Gardens, as well as the beautiful works of Gould and other naturalists, have familiarized us with the new and strange forms of animal and vegetable life in this region. But familiarity cannot abate our wonder and interest in the extraordinary diversities of structure thus localized and limited, which render New Holland the most remarkable of those provinces or centres of organized existence, into which, as a result of the more exact and extensive observation of the present time, the surface of the earth has been distributed. As respects the Flora, it is not merely a record of new genera, but of entire natural orders, unknown elsewhere in the world. The Eucalyptæ, or gum trees, with their hundred species and gigantic forms, and strangely contorted or vertically pointed leaves; and the leafless Acacias, with their as numerous species and yet more singular

* A principal cause of this saddening uniformity of aspect in the Australian vegetation is thus stated by our distinguished botanist, Mr. R. Brown, in the supplement to his *Prodromus Floræ Novæ Hollandiæ*—‘Quod magis notatu dignum ob numerum admodum insignem arborum et fruticum Australasiæ in quibus pagina utraque pariter glandulis instructa est; cujus structuræ prævalentia, verticali positione et exactâ similitudine paginarum sæpè comitatæ, characterem ferè peculiarem sylvis Novæ Hollandiæ et Insulæ Van Diemen impertit.’

organization, are the most striking of these vegetable anomalies. In the animal kingdom, with the exception of the dog, 'le seul animal qui a suivi l'homme partout sur la terre,' there is not a single indigenous quadruped known on any other continent;—no quadrumana, ruminating, or pachydermatous animals; no large mammalia indeed, and a general paucity of land animals; but those which do exist, remote from all our common analogies and conceptions, and forming a little world by themselves. Of the different species of kangaroos; the phascolomys, or wombat; the ornithorhynchus and echidna, the most anomalous of animals; the dasyurus, flying phalangers, &c., it has been well said by Cuvier, 'ils sont venus étonner les naturalistes par des conformations étranges, qui rompent toutes les règles, et échappent à tous les systèmes.'*

We have spoken of the interior of the Australian continent; but in fact our knowledge, except in a few places, scarcely goes beyond the outer margin of this great region. Where colonization has furthest penetrated, under the simple form of sheep pastures, it is still but in the proportion of Kent and Essex to the whole extent of England. The vast central part of the continent is still unknown, even to speculation. Were we to presume upon its physical characters from the parts now familiar to us, we must doubt whether even the enterprise of such men as have hitherto explored New Holland will ever do more than traverse it in particular lines, and these perhaps not touching the centre: still more must we doubt whether colonization on a large scale can ever extend itself deeply into the interior. The lapse of time, and the progress of man's inventions, removing or counteracting natural obstacles, may however render it otherwise in the event; and meanwhile these very physical singularities offer strong incitement to research, and to the solution of the numerous problems in geography, natural history, and general physics, arising in a region thus hidden from the rest of the world.†

It is to the coasts of this remarkable continent, at the distance of 15,000 or 16,000 miles from us, that the spirit of English colonization is now directing itself with a vigour so peculiarly its own. M. de Strzelecki prefaces his volume, happily enough, with

* *Discours sur les Révolutions de la Surface du Globe.*—In the British Museum there now exists a magnificent collection, richly illustrating every part of the Fauna of New Holland.

† The probability doubtless is, that the interior of New Holland, with certain peculiarities as to the distribution of the waters falling upon it, will be found one of those great *flats* of the earth's surface which Humboldt has so admirably described (1808) in his *Essay on the Steppes and Deserts of the Globe*—the Llanos and Pampas of South America, the Prairies of North America, the sandy Desert of Africa, and the vast plateau of the Tartarian Steppes in Central Asia.

a contrast between the savage and solitary aspect of Port Jackson, as described by Collins, when the first colonists, 1030 in number, arrived there fifty-seven years ago, and a narrative in the *Australian* newspaper of August 4, 1843, recording the ceremony of opening the Session of the Legislative Council, under more extended powers—the speech of the Governor moulded in the most approved form of such documents, and the pomps and pageantries of the scene very much in the European fashion, as the following extract from the paper will show :—

‘ At an early hour the House presented an animated and brilliant appearance, most of the seats in the body of the Chamber being filled with elegantly-dressed ladies, among whom we noticed Lady Gipps, Lady O’Connell, &c. . . . A guard of honour was drawn up in the court-yard of the Chamber, and his Excellency was received with presented arms, the band playing “God save the Queen.” The Governor was received at the door of the Council Chamber by the Speaker, who conducted him to the vice-regal chair, on the left of the Speaker’s chair. At this moment the appearance of the House was extremely striking—the elegant costumes of the ladies, and the brilliant uniforms of the official and military members, and of the numerous staff, which occupied places below the vice-regal chair, completing the *mise en scène*, which was in every respect worthy of the occasion. The mayor, aldermen, and common council of the city had seats within the bar. The strangers’ gallery was crowded to excess, as was also the reporters’ gallery,’ &c. &c.

Might we not fancy ourselves reading a London newspaper of the first week of February, rather than a journal of the antipodes? Our author, warm with wonder at these things, breaks out into expressions of admiration of the Anglo-Saxon race :—

‘ The hardy nature of this race is proof against the effects of transplantation, for it does not depend upon the soil either for its character or its nationality. The Anglo-Saxon reproduces his country wherever he hoists his country’s flag.

‘ The United Kingdom is far from furnishing a just idea of this race. The traveller there is like one buried in the entrails of a Colossus. It is in the United States, in the West Indies, in the factories of South America and China, in the East Indies, and in this town of Sydney, that the prodigious expansion of the Anglo-Saxon life, the gigantic dimensions of its stature, and the energy of its functions, are fully perceived and appreciated.’

The race, thus eloquently commended, is assuredly in a state of high activity in our Australian settlements; and though the prosperity of these colonies is in some sort intermittent, with intervals of depression between, yet is this but a miniature resemblance of the mother country, and from similar and connected causes. The main fact is that of vigorous and rapid progress,
checked

checked at times, but never subdued. The harbour of Sydney is crowded with vessels of every tonnage and from all parts; its streets swarm with people and business; its daily newspapers contain more advertisements than did a London newspaper sixty or seventy years ago; its courts of law, churches, schools, charitable institutions, joint-stock companies, circulating libraries, races, concerts, and assemblies, are all fashioned upon the English model; and will be bequeathed as such, whether for good or ill, to future generations and ages of Australia. We have nationality enough to believe that the good will largely preponderate in the scale, but time is required to put it to the test.

While speaking of this new capital of the south, we cannot resist quoting a passage from our author which gives a more favourable view of its moral and social condition than we derive from other writers. After reciting certain strong phrases from these works, he adds—

‘ Let the authors of these and other epithets, contained in their works on New South Wales, congratulate and applaud themselves: my mystification was complete. The evening I effected my disembarkation in Sydney, I did it with all imaginable precaution, leaving my watch and purse behind me, and arming myself with a stick, being resolved to encounter inevitable dangers with the least possible risk. . . . I found, however, on that night, in the streets of Sydney, a decency and quiet which I have never witnessed in any of the ports of the United Kingdom. No drunkenness, no sailors’ quarrels, no appearance of prostitution, were to be seen. George Street, the Regent Street of Sydney, displayed houses and shops modelled after the fashion of those of London; but nowhere did its lamps, or the numerous lights in its windows, which reflected upon the crowd, betray any of those signs of a corrupt state of society common to the streets of other capitals. Since then, how many nights like the first have I not witnessed, in which the silence, the feeling of perfect security, and the delicious freshness of the air, mingled with nothing that could break the charm of a solitary walk!’

Our present concern, however, is chiefly with the physical history of Australia; and we must quit therefore these matters of colonial morals, fervently hoping that the picture of Count Strzelecki is the truer one. For the same reason we must put aside the various questions of convict population and labour, of the appropriation and sale of lands, the amount of representative government safe or necessary in these colonies, the methods of taxation and expenditure, and the treatment of the aborigines—all subjects of great importance, and affording problems, the practical difficulties of which it requires much wisdom and experience to solve and surmount.

The *first* section of Count Strzelecki’s work relates, as we have said, to the different marine and land surveys of New Holland and

and Van Diemen's Land, from the time of Captain Cook's discoveries on these shores to the present day. In this narrative are briefly sketched the successive labours of Flinders, Bass, King, and Stokes in coast-surveys, and the equally meritorious services of Oxley, Sturt, Cunningham, Sir T. Mitchell, and others in exploring the interior of the country. The voyages of Flinders and King deserve commemoration, as striking examples of the ardour, ability, and perseverance which British officers carry with them to the performance of such duties. Captain King surveyed minutely about 2700 miles of coast; to complete which, it is estimated that he must have sailed nearly 40,000 miles, in small and faulty vessels, and along coasts very dangerous, and in great part unknown.

The Count alludes shortly and modestly to his own discovery of the tract named Gipps' Land, forming the S.E. portion of New Holland. But his researches, as extending along the Australian chain of mountains for many degrees of latitude, do in fact embrace much more of local discovery, curious to science, and profitable to future colonization. Having in view certain objects, chiefly geological, and finding himself in a country so vast and imperfectly known, he wisely prescribed boundaries to his survey; limiting it at first to the country running parallel with, and stretching 150 miles inland from the sea-coast, comprehended between the 30th and 39th degrees of S. latitude. But reaching the S.E. point of New Holland, he found that the same chain of mountains re-appeared in the succession of rugged and lofty isles of Bass's Strait, and again more largely developed in Van Diemen's Land; and with the same zeal and patience he extended his researches to the southern extremity of this island. A remarkable evidence of these qualities is the table he gives of the heights of various mountains, lakes, plains, and stations in the countries so surveyed. Out of about 230 altitudes, at least a hundred are derived from his own observations, either by two barometers and the back observations, or with Wollaston's boiling-water apparatus. We further know that he has prepared a geological map of New South Wales and Van Diemen's Land, on the large scale of one-fourth of an inch to a mile; and another sheet of vertical sections, the base and the height of the sections being each projected on one scale of four inches to the mile; with colouring on a new plan, well calculated to illustrate the geological characters and eras. These he is unable himself to publish; but he has given in this volume a small map, geologically coloured, and sufficient for all the purposes of the common reader.

In the *second* section, on Terrestrial Magnetism, M. de Strzelecki gives a table of declinations only, with the corresponding latitudes

latitudes and longitudes which he has observed at different points in New Holland and Van Diemen's Land. These observations were made in ignorance of that great scheme of magnetic inquiry in which so many nations of the earth are now associated, and which by various happy devices combines the labours of thirty-four magnetic stations scattered over the globe into one group of results. The strict simultaneity of time in taking observations, and the perfect similarity and completeness of instruments and methods, are the essential parts of this great scientific union, which is certain to be fruitful of important truths. England has twelve of these stations at different and distant parts of her empire; among which that of Hobart Town, established by Sir James Ross on his voyage of Antarctic discovery, is singularly important from its situation, and well provided in every way for the research.

The *third* section brings us to the Geology and Mineralogy of this region;—a subject manifestly in great favour with our author, and to which he brings ability and knowledge. We have just alluded to that long chain of mountains which forms a sort of *backbone* to New South Wales; and by reference to which all the subordinate formations may, as it were, be deciphered and read off. Count Strzelecki lived often for months together upon and among these mountains; determining the various facts required as to the succession, position, and structure of the masses and strata, by a series of zigzag sections made across the country; and by examination of the flanks of the dividing range, against which the different strata abut. Great labour and severe privations were incurred in this investigation; but he persevered in it to the end.

The chain of mountains in question, allowing for the interruption of Bass's Strait, has now been surveyed continuously for about 1200 miles, and presumably extends much further towards the north. That larger part of this line which belongs to New South Wales everywhere divides the waters flowing westwards into the interior, from those which run with shorter courses to the eastern coast. The chain rarely recedes more than sixty miles from this coast, and preserves great uniformity of direction, showing a cause of elevation which has operated rectilinearly over a vast space. Reaching the S.E. extremity of New South Wales at Cape Wilson, it is submerged beneath the sea; but projects, as we have seen, a chain of bold island-peaks above the waters of Bass's Strait, showing its continuity and identity of character. It breaks out again in lofty and more massive form in Van Diemen's Land, forming nearly the whole of that large island; and at its southern point plunges finally into the great
Southern

Southern Ocean—unless, indeed, we are to regard as remote prolongations of it the mountains of the newly discovered Antarctic land, and those vast volcanoes, loftier than Etna or Teneriffe, first seen by our intrepid navigator Sir J. Ross, and which pour forth fire within eleven degrees of the pole, and amidst regions of eternal ice and snow.

There is considerable uniformity of height throughout the portion of the chain hitherto examined. In that more northern part of it called the Liverpool range, there are peaks of greenstone, reaching an elevation of 4700 feet. Proceeding southwards, along that portion called the Blue Mountains, directly west of Sydney, the summit heights vary from 2500 to upwards of 4000 feet. In the Australian Alps, as they have been termed, near to Bass's Strait, the mountains become bolder, and the sienitic peak of Mount Kosciuszko reaches the height of 6500 feet; the greatest elevation yet ascertained in New Holland. In Van Diemen's Land the highest point is Mount Humboldt, 5520 feet; but Ben Lomond and other hills approach nearly to it.

We cannot afford space to do more than sketch in outline the geological and mineral characters of this mountain chain, and of those formations to which it may be considered as constituting an axis. The prominent circumstance here is, that the central heights along the whole extent of the dividing range, are composed of crystalline and irrupted rocks, granite, sienite, quartz rock, protogene, serpentine, greenstone, and other augitic rocks;—while the sedimentary strata, siliceous, calcareous, argillaceous, or bituminous, are confined to the eastern and western talus of the range, resting upon it either in vertical, inclined, or horizontal position. Of the former class, granite, sienite, and quartz rock, preponderate; and granite, according to our author, constitutes nearly the *entire floor* of the western portion of New South Wales, and extends far into the interior of New Holland; spread out in masses of mamillary, globular, or botryoidal form; closely resembling Humboldt's description of the strange tracts of bare irrupted granite which surround the great central masses of the Altai chain. It is exceedingly probable that several of the singularities of the Australian continent have their origin in this circumstance of physical constitution.

It is clear that subterranean heat and force have been largely at work here, as elsewhere;—crystallizing, elevating, contorting, and giving direction to the mountain ranges. Every extension of geological knowledge has extended our views as to these great agencies from below; and now that more exact observation in mines and Artesian wells has proved a constant increase of temperature in descending from a certain line near the surface, and
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even demonstrated the law of such increment, we no longer hesitate to admit the idea of the interior of the globe being occupied by matter, more or less fluid from its proper heat, and preserved from farther cooling by that consolidated crust around, which mankind tread upon and call their earth. Earthquakes and volcanoes are the present most obvious exponents of the disturbance which central movements and agencies (be they chemical, electrical, or whatever their nature) may create in this surrounding crust; to which may now be added on recent evidence, the slow rising of certain tracts of land by causes clearly acting from below. Some geologists, taking unmeasured time into their hands, have believed these forces, thus slowly acting, to be capable of producing all that we now see on the surface of the globe. We cannot think this to be so. The phenomena of gradual elevations are yet very partial and imperfectly known; while we find in the outward aspect of the earth,—the distribution, elevation, disturbance, mutual relation, and mineral contents of its mountain masses—an assured proof of forces once acting, the same perhaps in kind, but of infinitely greater energy than those which now fret or alter the surface on which we live. All science seems to us to concur in vindicating this belief; and reverting to the subject before us, we cannot doubt that such forces have been concerned in raising, at successive periods, the great Australian chain, and giving position to the conterminous strata.

Our author classes the rocks of New South Wales and Van Diemen's Land under four heads or epochs, each representing a period or state which may be fairly distinguished from others by evidences of superstructure or organic remains; though not precluding the likelihood of other less important epochs of disturbance and change. We will not quarrel with this arrangement as a provisional one in a new country, but it will require alterations hereafter to bring it into closer bearing with the more recent methods of geologists in Europe.

Under the *first* epoch he includes the mineral masses, which appear to have been irrupted or upheaved through the submarine crust of the earth, raising a tract of land so far as to prevent any further accumulation of marine deposits. These masses are composed of crystalline and unstratified, or of stratified rocks, neither containing any organic remains. We have already specified the former, and described the great extension of granite in particular in New South Wales. The primitive schists, mica slate, siliceous slate, and clay slate, are much less extensive, and attain less elevation than the unstratified rocks. At Mount Kosciuszko, where they surround the sienitic peak, they reach to 3200 feet, and are nearly vertical in position, showing the intensity of the expansive

expansive force at this point. In Van Diemen's Land both classes of rocks reappear, stretching to its southern extremity.

The *second* epoch is characterised by a different group of crystalline and sedimentary compounds, incumbent upon those just described, and containing the first traces of organic life. The stratified masses are chiefly siliceous and argillaceous slates, graywackes, sandstone, and conglomerates. Among the unstratified rocks we have various porphyries, granular quartz rock, amorphous and columnar greenstone, basalt, trachyte, serpentine, and various granular limestones. The localities of these several rocks, as of those of the first epoch, are given in some detail; with several of the more remarkable sections, illustrating them in series. Catalogues of the fossils contained in the limestones, sandstones, and graywacke of this group are also given, which organic remains are described more minutely in another part of the volume by Mr. Lonsdale and Mr. Morris. They belong to the Polyparia, Crinoidea, Conchifera, Brachiopoda, Gasteropoda, Pteropoda, and Crustacea. Though singularly scanty both as to species and individuals, yet are they important as associating some of the rocks in question with the Palæozoic series of other countries, though the points of relation require still to be more clearly made out. The crystalline unstratified rocks brought under this epoch are manifestly those of eruption, referrible to distinct and often distant periods, as proved by their relations to the strata with which they are in contact. Thrown forcibly upwards among the latter, the greenstone, basalts, and porphyries have strangely disturbed and dislocated them, more especially in Van Diemen's Land; the whole extent of which island shows marks of these ancient and violent revolutions, making the researches of the geologist there often very difficult and perplexing.

The rocks of the *third* epoch, though more limited in extent, are of greater interest, inasmuch as they include the coal formation of these countries, distributed into three principal basin-shaped localities, viz., the Newcastle basin in New South Wales, the largest in extent; and the South Esk and Jerusalem basins in Van Diemen's Land. Indications of similar basins have been found upon the same coast farther to the north, by Oxley, Cunningham, and other observers. The manner in which the mineral masses of the second epoch were added to the earlier formations, is considered by our author to explain this conformation, so well adapted to the important deposits which have taken place in the localities in question. For what so important in the actual condition of the world, as this extraordinary mineral, coal?—the staff and support of present civilisation, the great instrument and means of future progress! The very familiarity

familiarity and multiplicity of its uses disguise from observation the important part it bears in the life of man, and the economy of nations. We have often thought, with something of fearful interest, what would be the condition of the world, and of England in particular, were this subterranean treasure exhausted, or even much abridged in quantity. Yet such is the term to which, if the globe itself should last, our posterity must eventually come; and as respects our own country, the period, at the present rate of consumption, can be defined with some exactness. The immense coal basins of the Ohio and Mississippi will yet be yielding their riches to the then innumerable people of the Western world, when our stores are worked out and gone. Yet here also time will fix its limit. Geology gives no indication whatsoever of natural processes going on, by which what is once consumed may be recreated or repaired. The original materials of the formation may be said to be no longer present;—the agencies and conditions necessary to the work are either wanting, or partial and deficient in force. Whether human science, grasping at this time what seem almost as new elements of power committed to man, may hereafter discover a substitute for this great mineral, is a problem which it belongs to future generations to resolve.

The deposits in the three coal basins just mentioned, appear to be of different dates and conditions of formation, as shown by the differences of the coal and other strata in each. The Newcastle district, which extends about a hundred miles along the eastern coast, including Sydney, and the most populous part of the colony, contains the only mines yet much worked, and offers the largest future prospects to the miner. From one of the several sections here given, that of a coal-pit near the mouth of the Hunter River in this district, we find that in a depth of 204 feet there are five beds of coal, two of them 5 feet in thickness. The conglomerate which comes to the surface here, dips to the westward under thick masses of variegated micaceous sandstone; which rock, found in most places above the coal strata, and a yellow limestone containing *Bulinus* and *Helix*, are the highest beds in the geological series of the two colonies.

The coal deposits of Van Diemen's Land are of less extent and value than that just noticed. M. Strzelecki gives a mineralogical description, and analyses by himself, of several varieties of the mineral from different localities, as well as of the anthracite and lignite of Van Diemen's Land. In both countries, and especially in the latter, the coal strata have been invaded at successive periods by irruptions of greenstone and basalt, producing great disturbance and dislocation of the beds, as well as certain chemical

effects, testified in the characters and quality of the coal. In the South Esk basin, this series of strata, with the variegated sandstone above them, have been uplifted 2100 feet above the actual level of the basin.

The fossil Flora of the Australian coal formation (differing more or less for each basin) is interesting, not in the abundance of the species it affords, for they are singularly scanty, but in the total absence of the remarkable genera which characterise the European and American coal strata—the lepidodendron, sigillaria, stigmaria, calamites, and coniferæ. It would seem that during the carboniferous period, the Flora of these regions was as distinct from that of other parts of the globe as is that now existing under our eyes. It must be noticed, however, that there are strong analogies, or perhaps identity, between some of the fossil species and those of the Burdwan coal-field in India—a geographical relation of some value, especially if this observation should hereafter be extended to any points intermediate between these localities.

The *fourth* epoch, if such it may be called, includes the various accumulated materials which in the form of loose gravel or sand, elevated beaches, osseous and other breccias, &c., lie upon the stratified or unstratified rocks of the country; and probably represents, in part, the Pleiocene epoch of European geologists, though requiring further examination both in New South Wales and other parts of this great continent. We need not be detained here, otherwise than by noticing the magnificent fossil trees in the Derwent valley in Van Diemen's Land, which our author alludes to under this head. A microscopic examination of this opalized wood, by Dr. Hooker of the Erebus discovery ship, shows so much of coniferous structure as to justify the belief that forests of a species of pine once covered this district, where now no single tree, having such character, is found to exist.

In closing the geological section of his volume, Count Strzelecki gives a summary of facts, from which we extract the following results, as of practical importance to the agriculture of the two colonies:—

‘ In New South Wales the space occupied by the crystalline is to that of the sedimentary rocks as 3 : 1. In Van Diemen's Land it is as 7 : 1.

‘ A classification of all the mineral masses, unstratified or stratified, into two divisions, the one including rocks having more than 60 per cent. of silica, the other less than this per centage, shows—

‘ 1. That in New South Wales the area of granite, protogene, quartz rock, sienite, siliceous breccia, quartzose porphyry, siliceous slate, sandstone, and conglomerate, is to the area of eurite, feldspathic porphyry, greenstone,

greenstone, and basaltic rocks, containing less than 60 per cent., as 4.1 : 1.

' 2. That in Van Diemen's Land, on the contrary, the area of the first division is to that of the second as 1 : 3.'

This inverse ratio of siliceous to non-siliceous rocks in the two colonies, while showing the larger scale of volcanic action in Van Diemen's Land, determines the relative agricultural character of the soils of each: those of New South Wales better fitting it for a pastoral, those of Van Diemen's Land for an agricultural country.

We have elsewhere noticed the great paucity of simple minerals among the rocks of New South Wales. Though we do not find it mentioned by our author, it would seem that there is an equal scarcity of metallic ores, as might indeed be inferred from the geological conditions of the country. More, however, may yet be done by future discovery; and meanwhile we happily have proof that other parts of our Australian possessions—as, for example, the rising colony of South Australia—are better provided in this important particular.

We have also alluded before to the singular configuration of many parts of the mountain chain of New South Wales, owing chiefly to the admixture, protrusion, and sub-ramification of igneous rocks, throwing out rugged and abrupt *spurs* from each side of the principal range. The difficulty and risks to the explorer from this cause are exceedingly great. Our author thus describes them, in a part of the Blue Mountains to the west of Sydney, where a great basaltic spur, by its ramifications, has strangely disturbed and distorted the sandstone beds in this locality:—

' Between these ranges lie yawning chasms, deep winding gorges, and frightful precipices. Narrow, gloomy, and profound, these stupendous rents in the bosom of the earth are inclosed between gigantic walls of sandstone rock, sometimes receding from, sometimes overhanging the dark bed of the ravine, and its black silent eddies, or foaming torrents of water. Everywhere the descent into the deep recess is full of danger, and the issue almost impracticable. Engulfed, in the course of my researches, in the endless labyrinth of almost subterranean gullies of Mount Hay, and the river Grose, I was not able to extricate myself and my men until after days of incessant fatigue, danger, and starvation.'

Sir T. Mitchell, the surveyor-general of the colony, amply confirms this description in narrating the hazards encountered by the surveyors in attempting to reach Mount Hay. Mr. Dixon, one of them, penetrated to the valley of the Grose, until then unvisited by man; and after being bewildered for four days in the tortuous ravines around Mount Hay, without gaining access to

the mountain, he at length emerged in safety, 'thanking God' (to use the words of his official letter) 'that he had found his way out of them.'

In the following section of his work, our author treats of the climate of these colonies, under the several heads of winds, atmospheric pressure, rain and evaporation, dew and moisture, solar and terrestrial radiation, and temperature. To these subjects his attention has been industriously and accurately devoted; and fully appreciating the value of the method of averages, from which modern science has acquired so much both of extension and certitude, he refers, with just satisfaction, to a mass of 108,000 numerical elements, the results of as many particular observations; of which more than 17,000 were contributed by himself, during the five years he passed in the country. Without following all the details of this very valuable part of his work, we take a few of the more important facts and inferences from it. The subject is well known to be one of singular complexity, from the many elements of power simultaneously concerned, each separately active, each modified in action by the changes which are mutual and continual among all.

As respects the winds and atmospheric currents, out of a great mass of observations, principally derived from the meteorological register of Port Macquarrie, Port Jackson, Port Phillip, and Port Arthur, the conclusions are established that the winds, in veering, follow constantly one course, viz., from the right to the left of the meridian facing the equator; and that both as regards the rotation of winds, and their effect on the barometer, thermometer, pluviometer, and hygrometer, the phenomena are the reverse of what occur in the opposite hemisphere, confirming the law laid down by Professor Dove, in his '*Meteorologische Untersuchungen*,' to this effect.

Some very remarkable discrepancies in the prevailing winds of the several seasons at Port Jackson, Port Phillip, and Van Diemen's Land, are successfully traced to the influence of monsoons and winds which are found to exist within a certain distance of Australia. By projecting the direction of these, according to the limits which Horsburgh, Flinders, and King assign to them, it is found that the littoral of New Holland is surrounded by an exterior belt of atmospheric circulation, varying with the seasons as regards its direction, but constant in motion and intensity, and necessarily imparting to the atmosphere within this circuit certain regular eddies, similar to those observed in the sea or large rivers, and according with the actual results of observation.

The most singular phenomenon connected with the winds of New South Wales and Van Diemen's Land is that which is called

called in the colonies the *hot wind*; and fitly so named, since it raises the mean temperature of a summer day 40° Fahr. on the western side of the mountain chain, and 25° to 30° on the eastern. The mean direction of this wind is from the north-west; its velocity often exceeds that of a gale; its motion on the surface, as shown by bodies floating in the air, appears sometimes as if produced by rotation on a set of horizontal axes; at other times as resulting from a *ricochet* movement, and blowing by puffs. It is intensely dry, all clouds and vapours suddenly disappearing by absorption on its approach. The ordinary mean of evaporation of water in three hours being 0·045 of an inch, under the hot wind in the same time it reaches 0·150. It has been felt at the height of 5000 feet. Its common duration does not exceed ten hours, and it occurs but twice or thrice in the year. Though the wind is so hot in itself, the intensity of the solar radiation, as shown by a blackened thermometer, is materially lessened in passing through it.

‘The influence of this wind on vegetation, both indigenous and exotic, is extremely injurious. All the *gramineæ* and *leguminosæ* are parched by it, and the fruit of the *Ficus Australis*, as well as of the vine, is destroyed. The red and blue grape lose their colour, and their watery elements; the green leaves turn yellow and wither; the quality of the crops is generally deteriorated, and whole fields of promising wheat and potatoes are often laid waste. . . . Its effects on the human constitution partake of the character of those produced in Egypt by the sirocco or simoom;—a feverish heat, and determination of blood to the head, and in those subject to disorders of the lungs, a restrained action in breathing, at times bordering on suffocation, are symptoms confined to the whites alone. The suppressed perspiration, or rather its rapid evaporation, the relaxation of the muscles and vessels, inflammatory attacks, affections of the glottis, and ophthalmia, are common both to the aborigines and European races.’

It is clear that this wind, whatever its local modifications as generated or blowing over the continent of New Holland, is connected, in causes and phenomena, with the *hot winds* (however designated in different countries) which are known to us in Egypt and other parts of Africa, in Arabia, Central Asia, and different parts of the American continent. What these causes are, the present state of meteorological knowledge does not allow us fully to determine. That the great atmospheric agent, electricity, is largely concerned, we cannot doubt, from our own observation as well as that of others. M. Strzelecki does not give us any direct facts bearing on this point, as regards the hot wind of Australia; but in describing the zone of this wind as ‘a huge electric apparatus, highly charged,’ he assents to the general probability of the theory—connecting it at the same time with an observation on

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these atmospheric currents—which Humboldt, with his wonted ingenuity, was the first to fertilize, and to raise into the class of scientific causes. We allude to the fact of such currents of air being generally charged, more or less, with fine earthy particles, sand, or impalpable dust, all containing a notable portion of metallic matter. An atmosphere thus charged may have its temperature raised by the agency of these particles in reflecting or radiating heat, while at the same time it is very probable that its electric conditions may be altered and excited by the friction and mutual actions taking place in a current thus composed, and moving so rapidly over the surface.*

In treating of atmospheric pressure, our author gives tables showing the mean pressure and mean barometrical oscillations, for the winter and summer seasons of five successive years, at five different stations, reduced to 32° Fahr. Computing the mean diurnal variation from the phases of barometrical oscillation, which are ascertained to be nine in number, in the twenty-four hours, this is found to be only 0·085. The monthly maxima and minima of oscillation exhibit greater differences in winter than in summer. The amplitude of oscillation uniformly diminishes in proceeding northwards from Port Arthur, the extreme south, to Port Jackson, the extreme north of the extent included in the observations; according in this with the general fact of the decrease of oscillation from the pole to the equator in every part of the globe.

Except in confirming the general and intimate connexion of the winds with barometrical variations, we are not aware that the observations made in New Holland have yet done much to solve the perplexing phenomena of atmospheric pressure. It is clearly ascertained from the data furnished by Flinders and King, as well as by M. Strzelecki, that the barometer rises with the winds blowing from the pole, and falls with those from the equator, in conformity with the law to this effect established by Dove and Kämtz for the northern hemisphere. We understand, but without knowing details, that Sir James Ross, in his late antarctic expedition, ascertained the existence of a permanently low barometrical pressure in high southern latitudes, inferior by more than *a de-*

* ‘ Mais l’air de l’oasis de Mourzouk, n’est il pas constamment chargé de poussière, des petits grains terreux, qui s’échauffent bien autrement que l’air, et qui par leur rayonnement élèvent la température des basses couches de l’atmosphère ? ’—Humboldt’s *Asie Centrale*, vol. iii.

M. Strzelecki relates that on one occasion, when sailing from New Zealand to Sydney, he was prevented for two days from making Port Jackson by the violence of the hot wind, which, at sixty miles from the shore, had a temperature above 90°. The lee sails and reefs of the vessel were covered with an impalpable dust, at first mistaken for ashes, but on examination proving to be a sand, containing $\frac{1}{4}$ of aluminous and $\frac{3}{4}$ of siliceous and metallic matter.

gree to the mean pressure between the tropics—one of the many interesting results which this memorable voyage will hereafter, as we trust, place before us.

The other meteorological topics of solar radiation and temperature, rain, humidity and dew, are handled by our author with the same perspicuity and abundance of tabular details. It appears that the intensity of solar rays is greater in New South Wales than in Van Diemen's Land; but that owing to the more diaphanous atmosphere of the latter colony, the register of a blackened thermometer there yields higher numerical results than in the sister country. A curious inquiry follows, illustrated by numerous experiments on the relative power of absorption and emission of solar heat which the different soils of the two colonies possess; and proving that those derived from the disintegration chiefly of siliceous rocks, as in New Holland, have a low absorbing and a high radiating power; while the soils derived principally from greenstone, basalts, serpentine, &c., as in Van Diemen's Land, have a high absorption and low radiation. The injuries which these conditions would respectively produce upon the climate of the two colonies are shown to be admirably obviated by the influence of vegetation; which, differing in each from the difference of the soils, modifies greatly the radiation of their respective surfaces.

The whole of this inquiry, as well as that which follows, on the influence of the same physical causes upon the hygrometrical condition, the moisture, dew, and evaporation in these colonies, contains much that is new and valuable in itself, and suggestive of similar inquiries in other and older countries, where such facts ought to be better known to us.

The numerical data, furnished from six different stations, and including 8730 days' observations, show that the amount of rain is greater in New South Wales than in Van Diemen's Land, probably in connexion with the general law of increase in quantity of rain from the pole to the equator; and that both colonies receive a considerably larger amount than the average for England; 48 inches falling annually in New South Wales, and 41 inches in Van Diemen's Land. The greatest fall recorded at Sydney within twenty-four hours amounted to 25 inches; but further to the west the rains seem to be more violent as well as abundant, producing sudden and extraordinary inundations.

The temperature of these colonies, illustrated also by valuable tables, is an object of much interest, looking not merely to their present population and culture, but yet more to the future state of countries thus rapidly rising into greatness. The results of observation, according well with those derived from the practical experience of the colonists, are exceedingly favourable as respects
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this point. Taking the four more important of the six stations at which thermometrical registers have been kept, we find by comparison with other localities of the globe that

Port Jackson (Sydney) has the summer of Avignon, Constantinople, or Philadelphia; and a winter nearly similar to that of Cairo or the Cape of Good Hope. Its fluctuations of temperature correspond with those of Paris; and its annual mean with that of Messina in Sicily and the Cape of Good Hope.

Port Phillip, on the southern coast of Australia, resembles in its summer Baden, Marseilles, and Bordeaux; in its winter Palermo and Buenos Ayres. The fluctuations are those of Montpellier, and the annual mean that of Naples.

Launceston (Van Diemen's Land) in its summer resembles Mannheim and Toulouse; in its winter and annual mean Lisbon and Perpignan.

Port Arthur, the extreme southern station of Van Diemen's Land, possesses the summer of Dantzic, Augsburgh, and Jena, with a winter like that of Smyrna.

Such conditions of temperature are manifestly very favourable to equality of climate, while yet leaving sufficient range and diversity for the various exigences of cultivation. Accordingly we find that these colonies possess all the elements needful to the vigorous growth and extension of animal and vegetable life. On this subject we give our author's own words:—

‘Independently, however, of comparison and analogies, the climatic condition of New South Wales and Van Diemen's Land is represented in the most favourable light by its rich Flora, and by the healthy condition of its aborigines and its indigenous animals. Looking, indeed, at the singular and distinctive features by which its organic life is characterized, making this continent, as it were, a world apart, we cannot but wonder that the same climate, under which that life appears, should be likewise so well adapted to the maintenance of the vegetation and the animals of other hemispheres. The effect produced by the appearance of the plantain growing in company with the vine, apple, peach, and the English oak, and then again flourishing in the close vicinity of the *Eucalyptæ* and *Mimosæ*, is indeed surprising; nor is it less surprising to behold the kangaroo, sheep, emu, and horned cattle roaming together in the same forest, and seeking sustenance from the same herbage.

‘But what mainly illustrates the fertility and salubrity of both these countries is the healthiness of the English settlers who have taken root on the soil. No endemic disease, and seldom any epidemic of grave character prevails; and if individual indisposition, or even partial deterioration of the progeny is sometimes seen, it is to be traced to the pertinacity with which the English race cling to their original modes of living, wherever they settle, and however different their adopted may be from their native climate. It is to the abuse of strong wines, malt liquors,

liquors, and spirits, and particularly to the excessive consumption of animal food of the richest description, and even to the mode of clothing and housing, that individual diseases, such as dyspepsia, premature decay of teeth, and affections of the brain, may be attributed.'

The effect of extended cultivation in these colonies must be presumed to be that of rendering the climate hotter and drier—an ambiguous advantage, if not a certain injury, and one which may require further refinements in agriculture to give protection against it. The removal of dense forests and thick herbaceous underwood, and the creation of 280,000 acres of cultivated land, cannot be effected without many changes of atmospheric condition, as well as of the surface of the land itself.

The *fifth* section of the work relates to the Botany, the *sixth* to the Zoology of the Colonies, each division including respectively the fossil as well as the existing species. It might have been a better arrangement, and avoided some repetitions, if these sections had followed immediately that on Geology. As respects the existing species of plants, our author does not add to the catalogue of the Flora Australis, carried by the labours of Mr. Brown and the earlier explorers to 4000 species, and since enlarged by the addition of about 2000 more. His description of the general character and effect of Australian vegetation on the landscape is striking and well executed. The fossil plants hitherto collected by him and others are few in number, and derived almost exclusively from the coal formation and sandstone superincumbent upon it; or from a yellow limestone at Hobart Town, which furnishes the impressions of some unknown species of vegetation. We have already noticed the fossil plants of the coal strata, the specimens of which, brought home by M. Strzelecki, are minutely described. Though related in certain genera to the carboniferous fossils of the other hemisphere, yet are they so new and unlike in character as fully to maintain the singularity of New Holland, even in these vestiges of a former condition of the globe.

The Zoology of this region, as it relates both to fossil and existing species, is a subject justifying more details than we have space to give. One notable circumstance in the fossil Fauna is the extraordinary paucity of genera, species, and individuals in the rocks of the country, though the three great divisions of Vertebrata, Radiata, and Mollusca are all in one degree or other represented, with traces also of the Articulata. Our author, whose collections have considerably added to the number, divides them into such as correspond to the Palæozoic series, and those which may be considered to belong to the Pleiocene period. The specimens he collected of the Polyparia have been examined and described
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by Mr. Lonsdale, those of the Mollusca by Mr. Morris. Many of these are figured in plates at the end of the volume. Some few of the species seem to be identical with those of other countries; others allied to or representative of them;—many important genera, found largely in the corresponding deposits of Europe, are altogether wanting. The Fossil Mammalia are all recognised as belonging to the order of Marsupialia, a very curious evidence of the vast periods of time during which this type has prevailed in the Australian continent. They are referred to seven genera, two of which, the *Diprotodon* and *Nototherium*, are new to naturalists. We owe to the sagacity of Mr. Owen the definition of these animals; the description of which, derived from four specimens only of bones brought to England, is adorned, as we may well express it, by all the felicity of inference and illustration which belongs to this pre-eminent observer. From the astragalus of one of them, named the *Nototherium inerme*, is drawn the evidence of a marsupial vegetable-feeder as large as a rhinoceros; thus attesting here, as elsewhere, the ancient existence and subsequent annihilation of enormous representatives of the animal type still existing in the country. We recognise the same phenomenon and principle of change under the great diversity of objects which are submitted to it.

Of the recent Fauna a full catalogue is given, in which the discoveries of Mr. Gould among the Australian birds have a conspicuous part. As far as we know, the examination of these and of the mammalia may be deemed nearly complete. In other divisions there are still great deficiencies, as proved in the instance of the fishes, of which not more than sixty species are known to us. We cannot do more than slightly allude to the later researches of Mr. Owen on the *Ornithorhynchus*; in which, by showing its affinity to the reptiles in its generative system, and to extinct species of the *Ichthyosaurus* in certain parts of structure, he has added to the number of those anomalies which had already rendered this animal a problem and a paradox to zoologists.

The *seventh* section treats of the Aborigines of New South Wales and Van Diemen's Land—a race, or races, destined to future and not distant annihilation before the tide of white men setting in upon their country. In the latter colony they are already extinct by death or removal, after many bloody struggles with the worst part of the new settlers. On the coast of New South Wales but a few straggling families or individuals remain, and the same changes are every year carried further within the country. Take the best view we can of this matter and its consequences, there yet is something melancholy in the spectacle of a
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branch of the human race—well defined in its characters, though obscure in origin and rude in its manner of life—being thus removed for ever from the face of the earth. Count Strzelecki, whose whole work gives proof of warm and generous feelings, and whose mode of travel carried him much among the native tribes, after depicting their habits, faculties, and acquirements in more favourable terms than other writers, breaks out here with some eloquence:—

‘The manifold calamities, but more particularly the decrease and final annihilation of the great majority of indigenous races which has followed, and always does follow, the approach of the whites—is a fact of such historical notoriety that the melancholy instance of the Australian natives affords but a further corroboration of the fearfully destructive influence which the one race exercises upon the other. Those in whose eyes the question of decrease and extinction has assumed all the mournful interest and solemnity which it merits, have inquired into the nature of that invisible but desolating influence which, like a malignant ally of the white man, carries destruction wherever he advances; and the inquiry, like an inquest of the one race upon the corpse of the other, has ended for the most part with the verdict of “*Died by the visitation of God.*” ’

Not satisfied with this vague decision, and collating the evidence from his own direct examination of the aborigines of different countries, as well as from the reports of others, our author throws out a bolder view of his own;—viz. that the longevity has not been abridged in those native races, nor the rate of mortality increased, but that the power of continuing the species with males of their own race appears to be curtailed in many cases, if not in all, by intercourse of the aboriginal females with the European settlers. We cannot follow him into this topic; though admitting that the latter suggestion accords with some curious facts of modern physiology, and merits further investigation. But, except with more evidence than is given us, we must refuse assent to the previous assertions; and believe still, as heretofore, that the introduction of new diseases and new agents of disease—both more pernicious in their novelty—does materially increase the mean mortality among those races, and tend with other causes to their eventual extirpation.

The last and perhaps the most important topic in this volume, is the Agriculture of the colonies; and here again we have to commend largely the industry and various knowledge of M. de Strzelecki, who has given us the results of his examination into the physical and chemical characters of forty-one different soils, from the same number of colonial farms, illustrating thereby
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not merely the conditions of these particular localities, but all that relates to the causes of the fertility or sterility of soils in general. Three kinds of soils were selected from each farm; the best, the worst, and that which the occupier noted as a *particular soil*—each being then examined as to its situation, exposure, external characters, and the methods under which it was cultivated. Its physical characters were next determined—the power of absorption of solar rays, of emission of heat, and of absorption of atmospheric water. Lastly came the chemical examination of the soil; first, by determining the amount of soluble matter in 100 parts; secondly, by determining the proximate constituents of the same. In sequel to these separate details, the results of the whole are given in a tabular form, with practical conclusions annexed to them. The recital of these methods will justify our praise of M. Strzelecki's enlightened industry, and may perchance suggest similar means in application to soils more familiar to us.

We have already noticed the difference of the rocky materials of the two colonies, and their influence upon the soils—those of New South Wales containing one-third less of soluble matter—more silica, and a smaller quantity of alkalies and salts—than the soils of Van Diemen's Land. Compared, indeed, with the virgin soils of many other countries, as the United States, Canada, Mexico, Brazil, both are greatly inferior in their saline ingredients, and proportionally less fertile. But to this condition the indigenous vegetation of the country is admirably adapted. The Australian grasses are less alkaline than ours, and do not require the same richness of soil. The Eucalyptæ which cover the country can, by shedding their bark, dispense with the annual supply of alkali which trees shedding their leaves extract from the soil. It appears from comparative analysis that artificial culture has already been injurious in diminishing the organic constituents of the soils, as well as in altering their relation to the external agents of heat and moisture. These are points which it belongs to the future progress of agriculture to recognise and remedy.

The pastoral portion of these colonies is, perhaps, the most important, as well as most striking and characteristic. There is nothing here, either in mountain, plain, or forest land, which can recall the memory of any other region of the earth. The Australian Alps, at the height of more than 5000 feet, are as rich in the peculiar herbage of the country as the plains below. The Eucalyptæ, vast as they are in growth, do yet, from the peculiarity of their trunks and leaves, throw very little shade on the ground underneath; and the forests are scarcely less luxuriant than the open land in grasses fitted for pasture. The result of these

these circumstances, as regards sheep-breeding in particular, has been very remarkable. Hardly thirty years have elapsed since the first ram was imported into New South Wales, and the number of sheep now in the colony amounts to about nine millions! The simple economy of the stock-farms gave facility to their spread into the interior. The dividing chain of mountains was crossed, and the great plains beyond speedily covered with vast and growing flocks; not so much led by, as guiding their shepherds through these new and luxuriant pastures of the west. But evils grew up at the same time under a system thus loose and inartificial. The wool-growers of New South Wales were, in great part, men drawn from other occupations—many of them from the army and navy—ignorant of all but the high price of wool in England, and the expediency of increasing rapidly their number of sheep to take advantage of it. The pastures, first along the coast, afterwards on the western side of the mountains, became overstocked and exhausted of their herbage under the system of licensed squatting which prevailed;—occasional burnings, to produce fresh growth, did but increase the mischief—disease, from deficient management, came among the flocks—labourers and capital were more scantily supplied from home—while the fall in the price of wool in England, and the difficulties of the colonial currency, added to the general embarrassment. The years 1843 and 1844 were a crisis, agricultural and commercial, in the history of the colony, from which it is but just recovering. In Van Diemen's Land, where, from smaller space, properties are better defined, and the system of squatting upon licence not practised, there has been less of suffering from these causes. But neither here nor in New South Wales do we find yet much improvement in the management of sheep, or of pastoral land. The methods of breeding and rearing continue the same, and little is known as to the fitting rotation on pasture-ground. Great scope then exists for change and amelioration; but here, as in difficulties of more serious kind, we may safely confide in the energy of colonists who have already won to themselves a great country, and clothed it with so much of European verdure and civilization.

One of the most obvious improvements in the sheep-farming of these colonies will be to reduce the flocks while increasing the quantity of their produce of wool; a combination of objects which experience elsewhere has taught us to be perfectly practicable. The Count, looking to the quality of the pasture, recommends six acres as an average annual run for each sheep; these runs to be properly divided and apportioned, not solely for the sake of more equal pasturage, but also to provide for the due
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assortment of the sheep in breeding and rearing—points of infinite moment. Another important improvement will be the clearing away the vast quantity of dead timber which encumbers the ground, not merely obstructing vegetation, but taking off good wool from the fleeces as the sheep pass. And a further and great gain may be made by promoting the wilful burning of the sheep-runs by the shepherds; a point of more than ordinary consequence under the peculiarities of Australian surface and vegetation.

In passing from the wild pastoral regions to those of tillage, a complete change occurs both of landscape and human habits—more strongly marked here than in most other countries. In New South Wales 120,000 acres have now been brought under the plough; in Van Diemen's Land about 160,000 acres. Wheat, barley, oats, maize, English grasses, potatoes, turnips, &c., have been objects of cultivation from the first; tobacco was early introduced; and more recently the vine, with eminent prospects of success. The mode of working the land and the implements are the same as in England, as far as local circumstances allow; and, as in England, much room is open for improvements in draining and irrigation, manuring and rotation of crops.

The farms of the Australian Agricultural Company, in the most northern part of New South Wales, are cited by our author as the first in the scale of advancement. Here the banana grows by the side of the English oak, and both are surrounded by vines, orange and lemon trees, all flourishing and fruitful. The great agricultural district to the southward of Port Stephen, 2000 square miles in extent, is one of the richest and most thriving in the colony, and embraces many excellent farms. Nearer to Sydney the estates of the M^cArthurs (a family long and beneficially known in the history of the colony) are little inferior in excellence of cultivation to those of the Australian Company.

We have already seen that the rocks and soils of Van Diemen's Land, as well as other circumstances, render it better fitted for tillage than New South Wales; and accordingly we find the great valley districts of this island rapidly advancing in profitable cultivation, while showing, at the same time, vast capabilities of further improvement. The vale of the Tamar is the largest and richest of these; having with its branches a superficial extent of about 3000 square miles, 40 miles of inland navigation for vessels of 600 tons, good macadamised roads, an excellent soil, and great capacities for irrigation. The farm of Mona Vale in this district, the property of Mr. Kermode, is one of the
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finest in the country, though yet inferior in many points to the well-managed farms of the Van Diemen's Land Company. As a general description of this flourishing island we may well quote the words of our author:—

‘In Van Diemen's Land the agricultural districts are superior in appearance to those of New South Wales. The details of farms and farming are better understood and defined; and the practical results are such, that no country reminds the traveller so much of the *old one* as Van Diemen's Land. There the tasteful and comfortable mansions and cottages, surrounded by pleasure-grounds, gardens, and orchards,—the neat villages and prominently placed churches, forming, as it were, the centres of cultivated plains, divided and subdivided by hedge-rows, and through which an admirably constructed road winds across the island,—are all objects which forcibly carry back the mind to similar scenes of rural beauty in England and Scotland.’

Here we must close our examination of this valuable work. Whether read in this country or not, we can venture to guarantee to it an assured place, present and perspective, in the libraries of Australia. M. Strzelecki apologizes in the preface for his style, as ‘foreign and unidiomatic.’ In this we wholly differ with him. His language throughout is clear and vigorous, and, as our extracts will have shown, possesses the English idiom in a degree very remarkable for a foreigner. We shall be exceedingly glad to meet the same style again in any future volume which his Journals may offer to the public.
